Amendments to the Claims:

The following listing of Claims will replace all prior versions, and listings, of claims in the application:

Claims 1-26 (Canceled).

27. (Currently amended) A method according to Claim [[26]] 28 further comprising the step of:

calibrating the in vivo sensor circuit based on the level of the constituent element using a chronically tissue-implanted device.

28. (Currently amended) ~~A method according to Claim 26~~ A method for calibrating an in vivo sensor system, the method comprising the steps of:

generating a constituent element of an environment proximate to an in vivo sensor electrode via an in vivo generating electrode; and

determining a level of the constituent element in the tissue via the in vivo sensor electrode, wherein the step of generating comprises the steps of:

generating a first constituent element at a first time at the in vivo generating electrode; and

generating a second constituent element at a second time at the in vivo generating electrode.

29. (Original) A method according to Claim 28, wherein the step of determining comprises the steps of:

determining a first level of the constituent element between the first time and the second time; and

determining a second level of the constituent element after the second time.

30. (Original) A method according to Claim 28, wherein the step of generating the first constituent element comprises the step of generating oxygen, and

wherein the step of generating the second constituent element comprises the step of generating hydrogen.

31. (Original) A method according to Claim 28, wherein the step of generating the first constituent element comprises the step of generating an oxygen saturated environment proximate to the in vivo sensor electrode, and wherein the step of generating the second constituent element comprises the step of generating a hydrogen saturated environment proximate to the in vivo sensor electrode.

32. (Currently amended) A method according to Claim [[26]] 28, wherein the step of generating comprises the step of generating the constituent element using electrolysis.

33. (Original) A method according to Claim 28, wherein the step of generating the second constituent element is preceded by the step of waiting a time interval to allow the generated first constituent element to dissipate.

34. (Original) A method according to Claim 33, wherein the time interval comprises about 1 minute.

35. (Original) A method according to Claim 28, wherein the step of generating the first constituent element comprises the step of conducting a current from a first in vivo generating electrode to a second in vivo generating electrode through the tissue.

36. (Currently amended) ~~A method according to Claim 35,~~ A method for calibrating an in vivo sensor system, the method comprising the steps of:

generating a constituent element of an environment proximate to an in vivo sensor electrode via an in vivo generating electrode;

determining a level of the constituent element in the tissue via the in vivo sensor electrode, wherein the step of generating comprises the steps of:

generating a first constituent element at a first time at the in vivo generating electrode, wherein the step of generating the first constituent element comprises the step of conducting a current from a first in vivo generating electrode to a second in vivo generating electrode through the tissue;

generating a second constituent element at a second time at the in vivo generating electrode; and

wherein the step of generating the second constituent element comprises the step of conducting the current from the second in vivo generating electrode to the first in vivo generating electrode through the tissue.

37. (Original) A method according to Claim 28, wherein the step of calibrating comprises the step of determining a relationship between a current conducted by the in vivo sensor electrode and a third level of the constituent element using the first and second levels of the constituent element.

38. (Currently amended) A method according to Claim [[26]] 28, wherein the step of generating a constituent element of an environment proximate to an in vivo sensor electrode via an in vivo generating electrode comprises the step of generating a changing H^+/OH^- ion level proximate to the in vivo sensor electrode.

39. (Original) A method according to Claim 38, wherein the step of determining comprises the step of determining a rate of change of a voltage generated at the in vivo sensor electrode in response to the changing H^+/OH^- ion level.

40. (Original) A method according to Claim 37, wherein the step of calibrating comprises the steps of:

determining a maximum rate of change of the voltage; and

associating the maximum rate of change of the voltage with a voltage level that is associated with a neutral pH level.

41. (Original) A method for calibrating an in vivo sensor system, the method comprising the steps of:

generating a first constituent element of an environment proximate to an in vivo sensor electrode at an in vivo generating electrode;

determining a first level of the first constituent element via the in vivo sensor electrode;

generating a second constituent element of the environment proximate to the in vivo sensor electrode at the in vivo generating electrode; and

determining a second level of the second constituent element using an in vivo sensor electrode.

42. (Original) A method according to Claim 41 further comprising the step of:

calibrating the in vivo sensor using an in vivo device.

43. (Original) A method according to Claim 42, wherein the step of calibrating comprises the step of determining a relationship between a current in the environment and a third level of the first constituent element using the first and second levels of the constituent elements.

44. (Original) A method according to Claim 41, wherein the step of generating the first constituent element comprises the step of generating oxygen, and wherein the step of generating the second constituent element comprises the step of generating hydrogen.

45. (Original) A method according to Claim 41, wherein the step of generating the first constituent element comprises the step of generating an oxygen saturated environment, and wherein the step of generating the second constituent element comprises the step of generating an oxygen depleted environment.

46. (Original) A method according to Claim 41, wherein the step of generating the first constituent element comprises the step of generating the first constituent element using electrolysis.

47. (Original) A method according to Claim 41, wherein the step of generating the second constituent element is preceded by the step of waiting a time interval to allow the generated first level of the first constituent element to dissipate.

48. (Original) A method according to Claim 47, wherein the time interval comprises about 1 minute.

49. (Currently amended) A method according to Claim 41, wherein the in vivo generating electrode comprises a first in vivo generating electrode wherein the step of generating the first constituent element comprises the step of conducting a current from the first in vivo generating electrode to a second in vivo generating electrode.

50. (Currently amended) ~~A method according to Claim 49~~ A method for calibrating an in vivo sensor system, the method comprising the steps of:

generating a first constituent element of an environment proximate to an in vivo sensor electrode at a first in vivo generating electrode, wherein the step of generating the first constituent element comprises the step of conducting a current from the first in vivo generating electrode to a second in vivo generating electrode;

determining a first level of the first constituent element via the in vivo sensor electrode;

generating a second constituent element of the environment proximate to the in vivo sensor electrode at the in vivo generating electrode; and

determining a second level of the second constituent element using an in vivo sensor electrode, wherein the step of generating the second constituent element comprises the step of conducting a current from the second in vivo generating electrode to the first in vivo generating electrode.

51. (Original) A method for calibrating an in vivo sensor system, the method comprising the steps of:

generating a changing H^+/OH^- ion level proximate to an in vivo sensor electrode;

determining a rate of change of a voltage at the in vivo sensor electrode generated in response to the changing H^+/OH^- ion level; and

determining a rate of change of the voltage associated with the changing H^+/OH^- ion level.

52. (Original) A method according to Claim 51 further comprising the step of:

calibrating the in vivo sensor based on the determined rate of change of the voltage using an in vivo device.

53. (Original) A method according to Claim 52, wherein the step of calibrating comprises the step of associating the rate of change of the voltage with a voltage level that is associated with a pH level.

54. (Original) A method according to Claim 51, wherein the step of generating comprises the steps of:

generating an increase in OH^- ions and a decrease in H^+ ions proximate to the in vivo sensor electrode; and

generating a decrease in OH^- ions and an increase in H^+ ions proximate to the in vivo sensor electrode.

55. (Original) A method according to Claim 54, wherein the generating steps are performed more than once.

56. (Original) A method according to Claim 52, wherein the step of calibrating comprises the step of associating a maximum rate of change of the voltage with a voltage level that is associated with a neutral pH level.

Claim 57 (Canceled).

58. (Currently amended) A computer program product according to Claim [[57]] 59 wherein the sensor electrode and the generating electrode are adapted for chronically tissue-implanted use.

59. (Currently amended) ~~A computer program product according to Claim 57~~ A computer program product for calibrating a sensor system adapted for *in vivo* use, the computer program product comprising:

a computer readable storage medium having computer-readable program code embodied in said medium, said computer-readable program code comprising:

computer-readable program code for generating a constituent element of an environment proximate to a sensor electrode adapted for *in vivo* use via a generating electrode adapted for *in vivo* use; and

computer-readable program code for determining a level of the constituent element in the tissue using the sensor electrode, wherein the computer-readable program code for generating comprises:

computer-readable program code for generating a first constituent element at a first time at the generating electrode; and

computer-readable program code for generating a second constituent element at a second time at the generating electrode.

60. (Original) A computer program product according to Claim 59, wherein the computer-readable program code for determining comprises:

computer-readable program code for determining a first level of the constituent element between the first time and the second time; and

computer-readable program code for determining a second level of the constituent element after the second time.

61. (Original) A computer program product according to Claim 59, wherein the computer-readable program code for generating the first constituent element comprises computer-readable program code for generating oxygen, and wherein the computer-readable program code for generating the second constituent element comprises computer-readable program code for generating hydrogen.

62. (Original) A computer program product according to Claim 59, wherein the computer-readable program code for generating the first constituent element comprises computer-readable program code for generating an oxygen saturated environment proximate to the sensor electrode, and wherein the computer-readable program code for generating the second constituent element comprises computer-readable program code for generating a hydrogen saturated environment proximate to the sensor electrode.

63. (Currently amended) A computer program product according to Claim [[57]] 59, wherein the computer-readable program code for generating comprises computer-readable program code for generating the constituent element using electrolysis.

64. (Original) A computer program product according to Claim 59, wherein the computer-readable program code for generating the second constituent element waits a time interval to allow the generated first constituent element to dissipate.

65. (Original) A computer program product according to Claim 64, wherein the time interval comprises about 1 minute.

66. (Original) A computer program product according to Claim 59, wherein the computer-readable program code for generating the first constituent element comprises computer-readable program code for conducting a current from a first generating electrode adapted for *in vivo* use to a second generating electrode adapted for *in vivo* use through the tissue.

67. (Original) A computer program product according to Claim 66, wherein the computer-readable program code for generating the second constituent element comprises computer-readable program code for conducting the current from the second generating electrode to the first generating electrode through the tissue.

68. (Original) A computer program product according to Claim 59, wherein the computer-readable program code for calibrating comprises computer-readable program code for determining a relationship between a current conducted by the sensor electrode and a third level of the constituent element using the first and second levels of the constituent element.

69. (Currently amended) A computer program product according to Claim [[57]] 59, wherein the computer-readable program code for generating comprises computer-readable program code for generating a changing H^+/OH^- ion level proximate to the sensor electrode.

70. (Original) A computer program product according to Claim 69, wherein the computer-readable program code for determining comprises computer-readable program code for determining a rate of change of a voltage generated at the sensor electrode in response to the changing H^+/OH^- ion level.

71. (Original) A computer program product according to Claim 68, wherein the computer-readable program code for calibrating comprises:

computer-readable program code for determining a maximum rate of change of the voltage; and

computer-readable program code for associating the maximum rate of change of the voltage with a voltage level that is associated with a neutral pH level.

72. (Withdrawn) An electrode assembly comprising:

a substrate adapted for *in vivo* use;

a generating electrode, on the substrate and adapted for *in vivo* use in an environment, having a first shape that defines an interior region, wherein the generating electrode is adapted to generate a constituent element of the environment; and

a sensor electrode, spaced-apart from the generating electrode on the substrate and adapted for *in vivo* use, having a second shape and positioned in the interior region in a non-contacting relationship with the generating electrode, wherein the sensor electrode is adapted to determine a level of the constituent element generated by the generating electrode.

73. (Withdrawn) An electrode assembly according to Claim 72, wherein the first shape comprises a u shape and wherein the second shape comprises a strip shape.

74. (Withdrawn) An electrode assembly according to Claim 72, wherein the generating electrode and the sensor electrode are spaced-apart by about 1micrometer.

75. (Withdrawn) An electrode assembly according to Claim 72, wherein the first shape comprises an open circular shape defining a first central axis therethrough and wherein the second shape comprises a circular shape defining a second central axis therethrough, wherein the first and second central axes are co-axial.

76. (Withdrawn) An electrode assembly according to Claim 72 further comprising:

a reference electrode, on the substrate and adapted for *in vivo* use, having the first shape that defines a second interior region, wherein the generating electrode and the sensor electrode are located in the second interior region in a non-contacting relationship with the reference electrode.

77. (Withdrawn) An electrode assembly according to Claim 76 further comprising:

a counter electrode, on the substrate and adapted to *in vivo* use, having the first shape that defines a third interior region, wherein the generating electrode, the sensor electrode, and the reference electrode are located in the third interior region in a non-contacting relationship with the counter electrode.

78. (Withdrawn) An electrode assembly according to Claim 72 further comprising:

an insulating layer on the generating electrode and the sensor electrode, wherein a first portion of the sensor electrode is exposed through the insulating layer and has the first shape, and wherein a second portion of the generating electrode is exposed through the insulating layer and has the second shape.

79. (Withdrawn) An electrode assembly according to Claim 77, wherein a length of the first portion of the generating electrode is about 50 times greater than a width of the first portion.

80. (Withdrawn) An electrode assembly according to Claim 72, wherein the generating electrode is adapted to generate a first constituent element at a first time at the generating electrode and to generate a second constituent element at a second time at the generating electrode.

81. (Withdrawn) An electrode assembly according to Claim 72 further comprising a glucose selective enzyme on the sensor electrode.